

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application.

**Listing of Claims:**

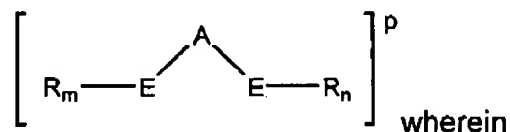
Claims 1 -12 are cancelled.

13. (Previously Presented) A transition metal catalyst system for olefin polymerization comprising:

I) a transition metal compound represented by the formula:

$LMX_r$ , wherein:

- (a) M is a Group 9, 10 or 11 metal;
- (b) L is a bidentate ligand defined by the formula:



- (i) A is a bridging group containing a Group 13-15 element;
- (ii) each E is independently a Group 15 or 16 element covalently bonded to M;
- (iii) each R is independently a  $C_1$ - $C_{30}$  radical or diradical group which is a hydrocarbyl, substituted hydrocarbyl, halocarbyl, substituted halocarbyl, hydrocarbyl-substituted organometalloid, or halocarbyl-substituted organometalloid;
- (iv) m and n are independently 1 or 2; and
- (v) p is the charge on the bidentate ligand such that the overall charge of  $LMX_r$  is neutral;
- (c) each X is, independently, a hydride radical, a hydrocarbyl radical, a substituted hydrocarbyl radical, a halocarbyl radical, a

substituted halocarbyl radical, hydrocarbyl-substituted organometalloid or halocarbyl-substituted organometalloid; a neutral hydrocarbyl-containing donor ligand; a univalent anionic ligand; a neutral non-hydrocarbyl atom containing donor ligand; or two Xs are joined and bound to the metal atom to form a metallacycle ring containing from about 2 to about 20 carbon atoms; or two Xs are joined to form an anionic chelating ligand; and

- (d) r is 1, 2 or 3;
- II) an activator; and
- III) a solid support wherein said transition metal compound is immobilized on said support, where the transition metal loading is less than 100 micromoles transition metal per gram of solid support.

Claims 14-16 are cancelled.

- 17. (Currently Amended) The catalyst system of claim 13 wherein said activator comprises an alkylalumoxane, a modified alkylalumoxane, an aluminum alkyl, an aluminum alkyl halide, an aluminum halide, an ionizing anion precursor compound ~~and/or~~ and/or a noncoordinating anion precursor.
- 18. (Previously Presented) The catalyst system of claim 13 where the transition metal loading is from 10 to 80 micromoles transition metal per gram of solid support.
- 19. (Previously Presented) The catalyst system of claim 13 where the transition metal loading is from 20 to 80 micromoles transition metal per gram of solid support.
- 20. (Previously Presented) The catalyst system of claim 13 where the transition metal loading is from 40 to 60 micromoles transition metal per gram of solid support.

Claims 21 to 29 cancelled.

30. (Previously Presented) The catalyst system of claim 17 wherein  $LMX_r$  has a square planar geometry.

Claims 31 -32 cancelled.

33. (Previously Presented) The catalyst system of claim 17 wherein the solid support comprises silica.

34. Cancelled

35. (Previously Presented) The catalyst system of claim 17 wherein M is a first row transition metal.

36. (Previously Presented) The catalyst system of claim 17 wherein A comprises at least one conjugated group.

37. Cancelled.

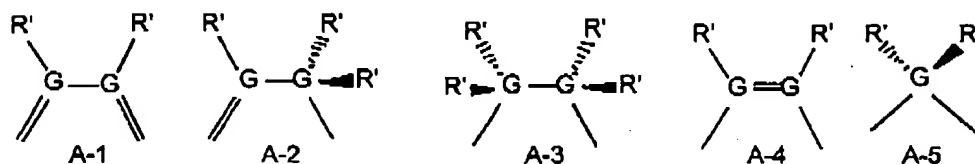
38. Cancelled.

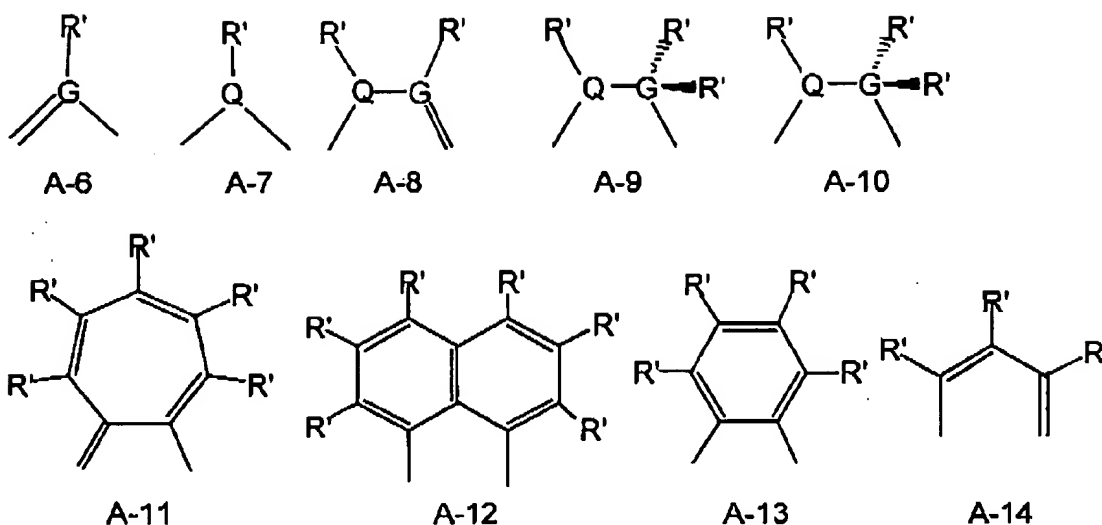
39. (Previously Presented) The catalyst of claim 17 wherein the activator comprises an alumoxane and the transition metal compound-to-alumoxane molar ratio is from 1:500 to 10:1.

40. (Currently Amended) The catalyst system of claim 13 wherein ~~the~~ M is Ni.

41. (Previously Presented) The catalyst system of claim 13, wherein the activator comprises methylalumoxane and/or modified methylalumoxane.

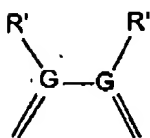
42. (Previously Presented) The catalyst system of claim 13, wherein the activator comprises a non-coordinating anion precursor and the total transition metal compound to noncoordinating anion precursor mole ratio is from 10:1 to 1:10.
43. (Previously Presented) The catalyst system of claim 13 wherein the activator comprises a non-coordinating anion.
44. (Previously Presented) The catalyst system of claim 43 wherein M comprises one or more of Ni, Pd, Pt, Cu, or Co.
45. (Previously Presented) The catalyst system of claim 44 wherein the transition metal compound-to-noncoordinating-anion molar ratio is from 10:1 to 1:10.
46. (Previously Presented) The catalyst system of claim 43 wherein A has at least one  
conjugated group.
47. (Previously Presented) The catalyst system of claim 43 wherein the transition metal is present on the support at less than 80 micromoles transition metal per gram of solid support.
48. (Previously Presented) The catalyst system of claim 43 wherein M is nickel.
49. (Previously Presented) The catalyst system of claim 43 wherein A is defined by the following formulae:





wherein G is a Group 14 element; Q is a Group 13 element; and R' are independently hydride radicals, C<sub>1</sub>-C<sub>30</sub> hydrocarbyl radicals, substituted hydrocarbyl radicals, halocarbyl radicals, substituted halocarbyl radicals, or hydrocarbyl- or halocarbyl-substituted organometalloid radicals, and optionally two or more adjacent R' form one or more C<sub>4</sub> to C<sub>40</sub> rings to give a saturated or unsaturated cyclic or polycyclic ring.

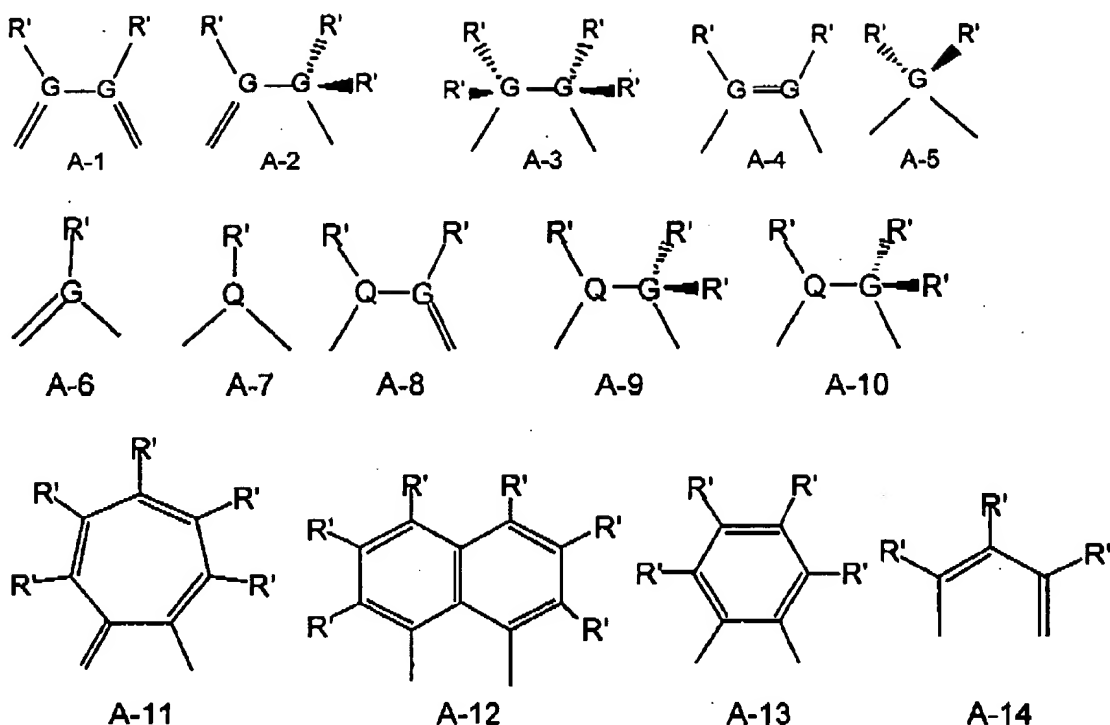
50. (Previously Presented) The catalyst system of claim 43 wherein M is nickel, E is nitrogen, m is 1, n is 1, p is 0, A is defined by the formula:



where each G is, independently, C, Si, or Ge, and each R' is a substituted phenyl group.

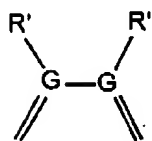
51. (Previously Presented) The catalyst system of claim 13 wherein the activator comprises an alumoxane.

52. (Previously Presented) The catalyst system of claim 51 wherein M is one or more of Ni, Pd, Pt, Cu or Co.
53. (Previously Presented) The catalyst system of claim 51 wherein the alumoxane comprises a modified alumoxane.
54. (Previously Presented) The catalyst system of claim 51 wherein the support comprises silica.
55. (Previously Presented) The catalyst system of claim 51 wherein the alumoxane comprises methylalumoxane.
56. (Previously Presented) The catalyst system of claim 51 wherein the alumoxane comprises modified methylalumoxane
57. (Previously Presented) The catalyst system of claim 51 wherein the alumoxane comprises an alkyl alumoxane.
58. (Previously Presented) The catalyst system of claim 51 wherein A has at least one  
conjugated group.
59. (Previously Presented) The catalyst system of claim 52 wherein the transition metal compound-to-alumoxane molar ratio is from 1:500 to 10:1.
60. (Previously Presented) The catalyst system of claim 51 wherein M is nickel.
61. (Previously Presented) The catalyst system of claim 51 wherein A is defined by the following formulae:



wherein G is a Group 14 element; Q is a Group 13 element; and R' are independently hydride radicals, C<sub>1</sub>-C<sub>30</sub> hydrocarbyl radicals, substituted hydrocarbyl radicals, halocarbyl radicals, substituted halocarbyl radicals, or hydrocarbyl- or halocarbyl-substituted organometalloid radicals, and optionally two or more adjacent R' form one or more C<sub>4</sub> to C<sub>40</sub> rings to give a saturated or unsaturated cyclic or polycyclic ring.

62. (Previously Presented) The catalyst system of claim 51 wherein M is nickel, E is nitrogen, m is 1, n is 1, p is 0, A is defined by the formula:



where each G is, independently, C, Si, or Ge, and each R' is a substituted phenyl group.

63. (Previously Presented) The catalyst system of claim 13 wherein the system is essentially without residual solvent.

64. (Previously Presented) The catalyst system of claim 63 wherein the activator comprises a non-coordinating anion.

65. (Previously Presented) The catalyst system of claim 63 wherein the activator comprises an alumoxane.

66. (Previously Presented) The catalyst system of claim 63 wherein the support comprises silica.

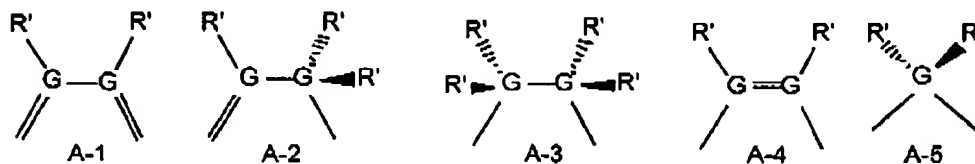
Claims 67- 69 cancelled.

70. (Previously Presented) The catalyst system of claim 63 wherein A has at least one conjugated group.

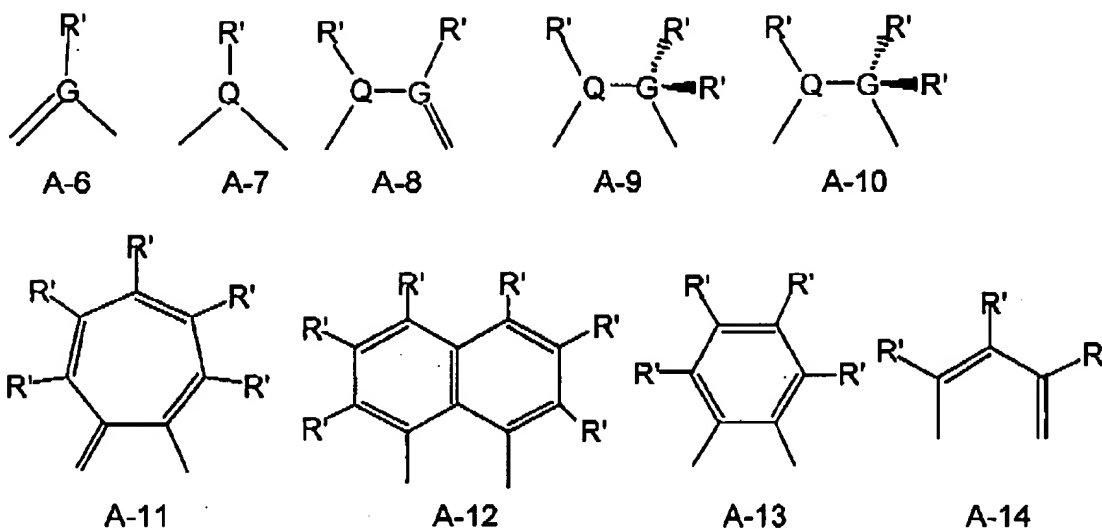
71. (Previously Presented) The catalyst system of claim 65 wherein the transition metal compound-to-alumoxane molar ratio is from 1:500 to 10:1.

72. (Previously Presented) The catalyst system of claim 63 wherein M is nickel.

73. (Previously Presented) The catalyst system of claim 63 wherein A is defined by the following formulae:

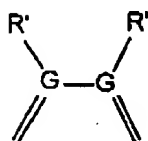






wherein G is a Group 14 element; Q is a Group 13 element; and R' are independently hydride radicals, C<sub>1</sub>-C<sub>30</sub> hydrocarbyl radicals, substituted hydrocarbyl radicals, halocarbyl radicals, substituted halocarbyl radicals, or hydrocarbyl- or halocarbyl-substituted organometalloid radicals, and optionally two or more adjacent R' form one or more C<sub>4</sub> to C<sub>40</sub> rings to give a saturated or unsaturated cyclic or polycyclic ring.

74. (Previously Presented) The catalyst system of claim 63 wherein M is nickel, E is nitrogen, m is 1, n is 1, p is 0, A is defined by the formula:



where each G is, independently, C, Si, or Ge, and each R' is a substituted phenyl group.

Claims 75 to 98 cancelled.

99. (Currently Amended) A catalyst system comprising the combination of the catalyst compound of claim 13 and tetrakis(perfluorophenyl)boron as the activator.
100. Cancelled.
101. Cancelled.
102. Cancelled.
103. (Previously Presented) The catalyst system of claim 13 wherein the activator comprises a Group 13, 14, or 16 halide salt.
104. (Previously Presented) The catalyst system of claim 13 wherein the activator comprises a group 15 oxyfluoride salt.
105. (Currently Amended) The catalyst system of claim 13 wherein the activator comprises  $\text{BF}_4^-$ ,  $\text{PF}_6^-$ ,  ~~$\text{TeOF}_6^-$~~   $\text{TeOF}_6^-$  and/or  ~~$\text{AsF}_6^-$~~   $\text{AsF}_6^-$ .
106. (Previously Presented) The catalyst system of claim 13 wherein the support comprises a non-coordinating anion chemically bound to the support.
107. (Previously Presented) The catalyst system of claim 13 wherein the support comprises a polymeric support.
108. (Previously Presented) The catalyst system of claim 13 wherein the support comprises one or more Group 2, 3, 4, 5, 13, or 14 metal or metalloid oxides.
109. (Previously Presented) The catalyst system of claim 13 wherein the support comprises one or more of magnesla, titanla, or zirconia.

110. (Previously Presented) The catalyst system of claim 13 wherein the support has a pore size of from 10 to 1000 Å.
111. (Previously Presented) The catalyst system of claim 13 wherein the support has a surface area of 10-700 m<sup>2</sup>/g.
112. (Previously Presented) The catalyst system of claim 13 wherein the support has a pore volume of 0.1 to 4 cc/g.
113. (Previously Presented) The catalyst system of claim 13 wherein the support has an average particle size of 10-500µm.
114. (Previously Presented) The catalyst system of claim 13 wherein the support has:
- a) a surface area of 50 to 500 m<sup>2</sup>/g;
  - b) a pore volume of 0.5 to 3.5 cc/g;
  - c) an average particle size of 20 to 200 µm; and
  - d) a pore size of 50 to 500Å.
115. (Currently Amended) The catalyst system of claim 114 wherein the transition metal compound is present on the support at a loading of 10-100 micromoles ~~µm~~ of transition metal ~~compound~~ per gram of support.
116. (Currently Amended) The catalyst system of claim 115 wherein the loading is 20 to 80 micromoles ~~µmoles~~ transition metal ~~compound~~ per gram of support.
117. (Currently Amended) The catalyst system of claim 115 wherein the loading is 40 to 60 micromoles ~~µmoles~~ of transition metal ~~compound~~ per gram of support..
118. Cancelled.

119. Cancelled.

120. Cancelled.